

REMARKS

The Office Action dated October 8, 2009 has been carefully reviewed, and the foregoing amendment has been made in consequence thereof.

Claims 18-23 are pending in this application. Claims 18-23 stand rejected.

Initially, Applicants wish to thank the Examiner for the courtesies extended to Applicants' representatives during a telephone conversation with Applicants' representatives on February 5, 2010. During the conversation, Applicants' representatives submitted that the combination of Bartos, Beck, and McDermott teaches away from the presently claimed invention and that the presently claimed invention has numerous functional advantages over Bartos, Beck, and McDermott. In that regard, the Examiner indicated that a declaration submitted under 37 C.F.R. 1.132 would help clarify Applicants' arguments and would reasonably address the obviousness rejection. As such, the declaration requested by the Examiner is filed herewith and is submitted as supporting the nonobviousness of the Claims.

The rejection of Claims 18-23 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,059,123 to Bartos et al. (hereinafter referred to as "Bartos") in view of U.S. Patent No. 5,944,483 to Beck et al. (hereinafter referred to as "Beck") or U.S. Patent No. 5,273,395 to McDermott (hereinafter referred to as "McDermott") is respectfully traversed.

As explained by the Federal Circuit, a reference teaches away "when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led a direction divergent from the path that was taken by the applicant." In re Gurley, 27 F.3d 551, 553 (Fed. Cir. 1994). In light of this standard, it is respectfully submitted that the cited art, as a whole, is not suggestive of the presently claimed invention. Specifically, Applicants respectfully submit that Bartos, Beck, and McDermott teach away from the presently claimed invention and, as such, support the nonobviousness of the presently claimed invention. Bartos teaches clamping a ring assembly in coaxial symmetry with a hub shroud to discharge liquid "perpendicular to the plane of the assembly" (i.e., to discharge liquid axially within the engine), which teaches away from the recitation in Claims 18 and 20 of being oriented to discharge liquid radially inwardly into the engine. Beck teaches extending individual nozzles into exhaust flow ducts and spraying in the flow direction of the exhaust (i.e., spraying axially into the flow ducts) (see figure 1 and column 4,

lines 51-55 of Beck), which teaches away from the recitation in Claims 18 and 20 of being oriented to discharge liquid radially inwardly into the engine given that, if liquid was to be discharged radially inwardly into the exhaust flow duct of Beck, the liquid would be discharged directly at the sidewall of the exhaust flow duct. McDermott teaches that discharging liquid “directly in the engine” is undesirable and that liquid should be discharged outside of the engine to generate a fog that is accelerated into the engine (see column 4, lines 40-48 of McDermott), which teaches away from the recitation in Claims 18 and 20 of being oriented to discharge liquid radially inwardly into the engine. As such, Applicants respectfully submit that Bartos, Beck, and McDermott teach away from the presently claimed invention and, therefore, cannot support an obviousness rejection of the presently claimed invention.

Additionally, Section 2141(V) of the M.P.E.P. states that: “Office personnel should consider all rebuttal evidence that is timely presented by the applicants when reevaluating any obviousness determination” and that the rebuttal evidence “may include evidence of ‘secondary considerations,’ such as . . . evidence of unexpected results.” Moreover, Section 2141(V) goes on to state that “[o]nce the applicant has presented rebuttal evidence, Office personnel should reconsider any initial obviousness determination in view of the entire record.” Accordingly, Applicants’ submit that the attached DECLARATION OF JOHN ACKERMAN SUBMITTED UNDER 37 C.F.R. 1.132 evidences the nonobviousness of the presently claimed invention, such as, for example, unexpected results associated with the presently claimed invention. Specifically, the attached Declaration indicates that discharging liquid radially inwardly, as recited in the presently pending claims, has the following advantages over discharging liquid axially, as taught by Bartos and Beck: (1) liquid discharged radially inwardly has a radial component of momentum that imparts both normal and tangential forces on blade build-up, giving the liquid a better scrubbing action than liquid discharged axially; (2) liquid discharged radially inwardly will not entrain in the airflow as much as liquid discharged axially, thereby reaching more of the surfaces that are parallel to the centerline of the engine; and (3) the volumetric distribution of radially inwardly discharged liquid particles naturally mimics the cross-section of the engine and, therefore, follows the distribution of the surface area to be cleaned better than liquid discharged axially (i.e., more of the radially inwardly discharged liquid particles are maintained near the highest fraction of compressor surface area, which is closer to the outer radius than the inner radius). Furthermore, the attached Declaration indicates that discharging liquid radially inwardly, as

recited in the presently pending claims, has the following advantages over discharging liquid outside of the engine, as taught by McDermott: (1) by discharging liquid outside of the engine, the momentum generated from discharge is lost, and only the airflow momentum is preserved, meaning that liquid discharged outside of the engine has a less effective scrubbing capability than liquid discharged radially inwardly, given that liquid with more momentum has a better scrubbing capability; and (2) by discharging liquid outside of the engine, control over the radial distribution of the liquid particles is lost, meaning that it is easier to prevent overly spraying particular surfaces of the engine when the liquid is discharged radially inwardly (e.g., it is easier to prevent mid-span areas from being overly sprayed). For at least these additional reasons, Applicants respectfully submit that the presently claimed invention is patentable over Bartos, Beck, and McDermott.

Moreover, Bartos describes a turbine engine cleaning unit (10). Unit (10) includes a water reservoir (18), a preservative reservoir (20), a cleaner reservoir (22), and a solvent reservoir (24). A ring assembly (96) injects fluid into a gas turbine engine. Ring assembly (96) includes two arcuate tube sections (222, 224) that are each coupled to a T-section (226). T-section (226) is coupled to a high pressure hose (94) that is coupled in flow communication with unit (10). Ring assembly (96) is mounted “in coaxial symmetry with the hub shroud of the turbine engine” to spray liquid perpendicular to the plane of the assembly (i.e., to discharge liquid axially within the engine) (see column 5, lines 23-28 of Bartos). Notably, Bartos does not describe or suggest a ring manifold including a spray nozzle that can be oriented to discharge liquid radially inwardly.

Beck describes an exhaust-gas turbine of a turbocharger having a turbine casing (1) formed by gas-inlet and gas-outlet casings (2 and 3). A turbine impeller (5) is positioned upstream of a nozzle ring (7), and a flow duct (8) is formed between turbine impeller (5) and turbine casing (1). Flow duct (8) receives exhaust gases of a diesel engine connected to the turbocharger and passes them on to turbine impeller (5) (i.e., flow duct (8) is positioned downstream of a compressor). A nozzle ring (7) having a plurality of nozzles (11) is positioned such that each nozzle (11) extends into flow duct (8) to facilitate injecting water (37) axially into flow duct (8). Notably, Beck does not describe or suggest a ring manifold including a spray nozzle that can be oriented to discharge liquid radially inwardly.

McDermott describes a method of cleaning a gas turbine engine. The gas turbine engine includes a cylindrical hollow portion (2) and a curved air-flow directional portion (4).

A manifold ring (20) is mounted outside of and apart from the gas turbine engine via a support frame (38) such that the liquid is discharged outside of the engine to generate a fog that is accelerated into the engine (see column 4, lines 40-48 of McDermott). McDermott also teaches that discharging liquid “directly in the engine” is undesirable (see id.). Notably, McDermott does not describe or suggest a ring manifold including a spray nozzle that can be oriented to discharge liquid radially inwardly.

Claim 18 recites a gas turbine engine assembly including “a gas turbine engine comprising a compressor; a pump; and a ring manifold coupled in fluid communication with said pump, said ring manifold mounted within said gas turbine engine upstream from said compressor, said ring manifold comprising a plurality of circumferentially-spaced spray nozzles, wherein at least one of said plurality of circumferentially-spaced spray nozzles is oriented to discharge liquid radially inwardly such that at least a portion of said compressor is coated with the liquid.”

No combination of Bartos, Beck, and McDermott describes or suggests a gas turbine engine as is recited in Claim 18. Specifically, no combination of Bartos, Beck, and McDermott describes or suggests a ring manifold including a spray nozzle that can be oriented to discharge liquid radially inwardly. Rather, in contrast to the presently claimed invention, Bartos teaches discharging liquid axially into an engine, Beck teaches discharging liquid axially into an exhaust flow duct of an engine, and McDermott teaches that discharging liquid directly in an engine is undesirable. Accordingly, Claim 18 is submitted as being patentable over Bartos, Beck, and McDermott.

Claim 19 depends from independent Claim 18. When the recitations of dependent Claim 19 are considered in combination with the recitations of Claim 18, Applicants respectfully submit that Claim 19 likewise is patentable over Bartos, Beck, and McDermott.

Claim 20 recites a washing system for a gas turbine engine having a compressor. The washing system includes “a pump; and a ring manifold configured to be coupled in fluid communication with said pump, said ring manifold mountable within said gas turbine engine upstream from the compressor, said ring manifold comprising a plurality of circumferentially-spaced spray nozzles, wherein at least one of said plurality of circumferentially-spaced spray nozzles is configured to be oriented to discharge liquid radially inwardly.”

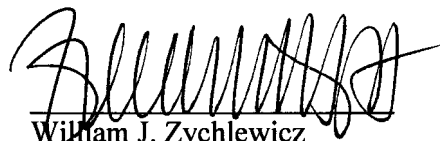
No combination of Bartos, Beck, and McDermott describes or suggests a washing system for a gas turbine engine as is recited in Claim 20. Specifically, no combination of Bartos, Beck, and McDermott describes or suggests a ring manifold including a spray nozzle that can be oriented to discharge liquid radially inwardly. Rather, in contrast to the presently claimed invention, Bartos teaches discharging liquid axially into an engine, Beck teaches discharging liquid axially into an exhaust flow duct of an engine, and McDermott teaches that discharging liquid directly in an engine is undesirable. Accordingly, Claim 20 is submitted as being patentable over Bartos, Beck, and McDermott.

Claims 21-23 depend from independent Claim 20. When the recitations of dependent Claims 21-23 are considered in combination with the recitations of Claim 20, Applicants respectfully submit that Claims 21-23 likewise are patentable over Bartos, Beck, and McDermott.

For at least the reasons set forth above, Applicants respectfully request that the rejection of Claims 18-23 under Section 103 be withdrawn.

In view of the foregoing amendment and remarks, all of the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action are respectfully solicited.

Respectfully submitted,



William J. Zychlewicz
Registration No. 51,366
ARMSTRONG TEASDALE LLP
One Metropolitan Square, Suite 2600
St. Louis, Missouri 63102-2740
(314) 621-5070